

David Thomas Gwynne-Vaughan.

With Portrait.

DAVID THOMAS GWYNNE-VAUGHAN¹ was born on March 12, 1871, at Royston House, Llandovery, his mother's home. He was the eldest child of his parents, Henry Thomas Gwynne-Vaughan, of Cynghordy, and later of Erwood Hall, Breconshire, and Elizabeth, second daughter of David Thomas, of Royston House, Llandovery, who died in 1874. His father, who had two daughters and a son by a second wife, died in 1890.

The Vaughans are an ancient Welsh family, descended from Sir Roger Vaughan, who was killed at Agincourt, and was one of the 'three valiant Welshmen . . . who had rescued the King, and were knighted by him as they lay bleeding to death'.

Going back to more mythical days the Vaughans trace their descent to Cradoc of the Strong Arm, one of the Knights of the Round Table, and further back still. In remote days the Gwynnes of Cynghordy and the Vaughans are said to have had a common ancestor in Aulach, great-grandfather of Cradoc, who again was the descendant of Gwarldeg, King of Garthmadryn (now Brecon) (A. D. 230?).²

That extraordinary person Thomas Vaughan, the Rosicrucian and alchemist (1621-65), belonged to another branch of the family.

David Gwynne-Vaughan attended a preparatory school at Kington, Herefordshire, and later, the Monmouth Grammar School.

In the October term of 1890 he entered Christ's College, Cambridge, with an exhibition from his school, and in the following year obtained a scholarship in Science from the College. He was thus a member of Charles Darwin's college, an association which, as it seems to me, had a special appropriateness. He took a First Class in Part I of the Natural Science Tripos in 1893.

Gwynne-Vaughan did not go on to Part II of the Tripos, and thus had no opportunity at Cambridge of showing his real powers. During the year after he left Cambridge, he was engaged in teaching, as Science Master at a school.

¹ I am indebted to Mrs. H. C. I. Gwynne-Vaughan, D.Sc., F.L.S., for particulars of her husband's life and family, and for much kind help in other ways.

² I understand that much more information about these old families is to be found in Jones's History of Brecknockshire and Nicholas's Annals and Antiquities of the Counties and County Families of Wales.

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I first became acquainted with Gwynne-Vaughan in the autumn of 1894. It was at the invitation of the Director, Sir W. T. Thiselton-Dyer, that he came to work at the Jodrell Laboratory, of which I was then Honorary Keeper. After a couple of preliminary visits he started work on Oct. 12, beginning, by way of practice, with an examination of the roots of *Pandanus*. We used to go round the houses and pits together, and he soon became familiar with the treasures of Kew. He made a good many observations on Cycads, and took part in the hunt for centrosomes, on which in those days we were all bent, led by the flattering tale which had been told so well.

Gwynne-Vaughan's skill as a microscopist soon became evident, and from the outset he was very keen. For the first three months or so his work was rather miscellaneous—he was getting into training. In January, 1895, he began to settle down to definite research. His first subject was the anatomy and morphology of Nymphaeaceae, on which he made some curious and interesting observations, afterwards embodied in his Notes of 1896 and paper of 1897, referred to further on.

Kew provided him with some specially interesting material for his work; in particular, a whole series of seedlings of *Victoria regia*, at successive stages, was placed at his disposal. In suggesting the group for investigation, I had specially in view the peculiarities of its anatomy, to which Gwynne-Vaughan was soon able to add some new and unexpected features; at the same time his attention was further directed to points in the external morphology.

A little later, in May of the same year, he took up another anatomical subject, the structure of polystelic *Primulas*; as the result of his observations he was able to make a considerable advance on the views of Van Tieghem.

About this time there was some question of his going on an expedition to South Brazil, but it was not till a couple of years later that his hopes of tropical travel were realized.

In September, 1895, Gwynne-Vaughan attended the meeting of the British Association at Ipswich, the first at which a separate Section for Botany was constituted.

On October 8, 1895, W. H. Lang (now Professor of Cryptogamic Botany in the University of Manchester) first came to the Jodrell Laboratory. This was the beginning of the close and life-long friendship between him and Gwynne-Vaughan.

In November of that year Gwynne-Vaughan showed me the draft of his Nymphaeaceae paper, the first written product of his work; it was considerably extended before publication, and some of the most interesting results were recorded meantime in two Notes in the 'Annals of Botany' (1896).

Lang was working at apogamy in Ferns, and on August 20, 1896, made his astonishing discovery of the occurrence of sporangia on the prothallus. Gwynne-Vaughan was present, and when they told me what Lang had found, I did not believe a word of it, but thought they were 'chaffing'. However, it was quite serious, and within a few days another case of the same kind came to light in a different Fern. I mention this here, because Gwynne-Vaughan and Lang were working in the same room, and the former was just as keen on Lang's results as the discoverer himself.

In September, 1896, Gwynne-Vaughan was present at the Liverpool meeting of the British Association, and this visit had an important influence on his after career. He read a paper on 'The Arrangement of the Vascular Bundles in certain Nymphaeaceae'. Professor Bower was impressed by this 'peculiarly lucid preliminary statement', and at once offered Gwynne-Vaughan the Junior Assistantship in his laboratory at Glasgow. If Kew may claim to have first started Gwynne-Vaughan on original work, it was at Glasgow that he developed his most characteristic line of research.

During the ensuing autumn Gwynne-Vaughan again worked at Kew, completing his paper on Nymphaeaceae and his investigation of the anatomy of *Primula*. The former was passed for publication by the Council of the Linnean Society on Dec. 17. Next day I said good-bye to him at Kew, and with the New Year (1897) his Glasgow career began.

It was not long, however, before his energies were diverted for a time into other channels. He accepted a commission to undertake a journey in South America, up the rivers Amazon and Purus, to report on the Rubber production of the district for a commercial syndicate, starting on Oct. 9, 1897.

He travelled 2,500 miles up the great river and its tributaries, and reached the Bolivian frontier.

I am permitted to make some extracts from letters written on this and on the subsequent Malayan journey, to his half-sister in England. The first is from a letter, written between Obidos and Serpa, and post-marked 4/12/97:

'But the journey up the Amazon is the most fascinating thing I have yet experienced. In parts we steam along a biscuit toss from the margin of the stream, which is bordered on either side by a solid wall, 60 ft. high, of virgin, impenetrable Forest of the most luxuriant tropical vegetation. Palms of various kinds stand out in delicate relief against the darker mass of giant trees of India-rubber, *Mimosae*, *Bertholletia*, &c., and the very water's margin is crowded with gigantic plants of the *Arum* family, reaching even to 20 ft. high. It is vain to attempt to describe the positively wanton prodigality of nature in these regions. Most of this Forest

is 2-6 ft. sunk in water for the extent of many miles on either side of the free stream.'

'Every common weed in the streets is completely new to me, and the size and beauty of the flowers in the waste spaces are very impressive—every one is new to me, and I am feeling very confused with it all, when I think that the wealth of the Virgin Forest has yet to be encountered.'

The next extract is from a letter written just after his return to Kew :

'For a description of the journey along thousands of miles of river, flanked by ancient Forest over 100 ft. high, the strange beasts in the water and on the land, the occasional settlements we met with, and their inhabitants, the Indians almost white and quite pleasant fellows that we came across, the miles that I have walked in the half-flooded, damp, and heated "Gapo" or low-lying Forest, with the thermometer at 90° in the shade, alone with a single Indian guide and a flask of the local "40-rod exterminator"—of all these anon. Of snakes and sun—but as Rudyard would remark, "That's another story". These I must keep until the fortunate hour in which we next meet.

'Myself and my companion were travelling against time, so I'm sorry to say my botanical results were only meagre, and I am haunted by an appropriate quotation :

"Ah, fool was I and blind ;
The worst I stored with *utter toil*,
The best I left behind."

I'm going to fire this off at a good many ; an apt quotation is the best sort of excuse.'

On Sept. 16, 1898, he was back in England, and returned to Kew to work for a time at the laboratory again. During this visit he was doing the anatomy of *Loxsoma*, and afterwards of other Ferns, for his solenostely papers. We had many discussions on questions of stelar morphology and the comparative anatomy of Ferns. He stayed at Kew over Christmas, leaving on Jan. 3, 1899.

The following month he started on his second tropical journey, that to the Malay Peninsula. It is characteristic of him that the interval between these two adventurous expeditions was filled up with regular laboratory work.

From *The Times*, Spring, 1899 :

'*Cambridge Expeditions in the Far East.*

'An expedition, under the leadership of Mr. W. W. Skeat, left Cambridge a few days ago for Bangkok. The members of the party include Mr. Gwynne-Vaughan, of Christ's College, and Messrs. Evans & Annandale, of Oxford, and it will be reinforced at Singapore by Mr. Bedford, of King's College.

The object of the expedition is to make a scientific survey of the little-known country lying south of Siam and north of the protected States of the Malay Peninsula.'

As his experiences on the Malayan trip were of considerable interest, rather full extracts from his letters, above referred to, are given.

Approaching Singapore, March 8, 1899.

'I dread Singapore; we have an appalling number of engagements to make there, in the least possible time. If nothing else, you have a peaceable time at sea, a time that I love, though Malayan has done its best to spoil this trip as Portuguese did my former one; still I live in hopes of returning. If I do I am afraid this will upset the last chance of settling down and quiet work in England. I greatly fear the East, for was I not born a tramp-Royal?'

As we shall see, this anticipation was very far from being fulfilled.

Bangkok, Siam, March, 1899.

'I have dined at a Siamese Prince's, Prince Naret, in dress clothes and a stick-up collar, eaten a splendid European dinner, conversed with his wife, who is a delightful little person, but she chews betel to such a degree that an average European would have a fit, and talked over the odds on the Varsity boat-race with his son, Prince Charoon, an old Cambridge man and a very nice fellow too, while looking on at a Siamese dramatic performance commanded at the Prince's house for our benefit, and that of the officers of a British warship at present in port.

'Last night we dined on board the same, after having spent a long day at Ayuthia, the former capital of Siam, a wonderful place, a city which formerly contained about a million inhabitants, but now only a few majestic ruins scattered among a jungle only penetrable with difficulty. Huge palaces and temples, an image of Buddha 40-50 ft. high, and sitting at that, alone, huge, stately, and impassive in its vast unroofed and crumbling temple, while the irresistible jungle is steadily covering, destroying, and breaking down all things around it. I now know, as few do, what is meant by the "The Letting in of the Jungle". I stood in the hand of this gigantic idol and declaimed "The Karela, the bitter Karela", &c.

'The Malay is grievously misjudged in England. I distinctly like the race. They are a folk who are proud and sensitive, the only race in the East who look you straight in the face when they speak to you. In their manners they are naturally gentlemen. They admit a possible superiority in Englishmen, but hold all the Eastern races in strong contempt. It is true that they have some excusable little eccentricities, such as running amok and using their kris too freely, but then no race is altogether perfect.'

Singora, April, 1899.

‘When we landed at Singora we arranged for some boats and a dozen Siamese boatmen to take us and our band of brigands up the Ta Lei Sap, a large inland sea here which only two Europeans have ever seen before. This we did, thanks to our credentials from the Siamese Government, pretty comfortably, and having reached a village half-way up we started our collections. Then the party divided. I and another one, Evans, started in the boat, and the other two went inland to investigate a tribe of very primitive savages with peculiarly repulsive and interesting methods of burying. I and Evans went in search of another lake to the north of Ta Lei Sap, called Ta Lei Nawi, found and entered it, being the first Europeans to see that fine sheet of water. That night I attained the Ultima Thule of a traveller’s desire, that is, I reached a spot where I was the very first white man to tread the soil. I should like to draw you a picture of our evening meal, after thirteen and a half hours’ fast too, as we sat and wolfed, with a ring of about seventy natives seated around at a respectful distance, and observing us with interest and sundry guttural remarks. My gun caused considerable comment next day (I do the shooting of the Expedition, and do it extremely well). N.B. I have had a lot of luck in shooting lately, and must “blow” a bit. I had some difficulty in doing much there, because the *whole* village insisted on accompanying me, and made enough noise to frighten all the game into the next continent.’

Biserat in Falor (undated).

‘Here I have made the acquaintance of a most villainous old brigand in a village near a mountain just here; he has instituted himself as my companion and mentor in shooting excursions and ascents of the hill, and he has just shown me, as a great treat, the entrance of a cave which runs direct into the hill. We have been yearning for caves for some time, and I am very pleased, because the very next day I got torches and, accompanied by my hired assassin, we have explored it. He, the betel-chewing old assassin in question, is the only man here who dares enter, because there are a large number of exceptionally ferocious and horrible “Hantus” (Demons, or Devils, mixed up a good deal with ghosts). A strong wind comes out from the mouth of the cave, which is their breathing. The brigand did his utmost to dissuade me for my own good, advancing numerous weighty reasons, such as that the cave ended in a pit which dropped through to the infernal regions, and that it was not the right time of year. Somewhat incongruous, isn’t it? He only screwed himself up to accompany me by the offer of bullion, and by assurances that I had paid special attention to cave-demons, and was capable of coping with any likely to appear; indeed, I openly confessed to intimate acquaintance with several cave-devils of the higher class. Further, he besought me to bring a little

stick (very ordinary stick) that I have had given me, and which is universally known to be peculiarly efficacious for almost all kinds of Hantus. This reads funny, but the old boy genuinely believes it, or fancies he does. We said charms before we entered, both of us. Mine (the genders of Latin nouns ending in -is) pleased him vastly, and he would very much like to learn it, especially when I told him that it could be used in other cases too, as well as cave Hantus, especially when prefaced with

“Feminine -do -io -go -is, -as -ans and -x, will show

-Es, if no increase be needed, -s by consonant preceded”.

‘The cave turned out to be really fine, with magnificent Cathedral-like domes, far into the mountain. Since then I have found a simply majestic Cathedral cave, with a small opening at the top and others imitating clerestory windows, the floor strewn with huge stalagmites imitating white marble tombs. I have never seen anything like it. I also found a deep pot-hole, which I descended by a rope. I got about 150 ft. down, when it stopped slanting and dropped sheer. I laid myself out on a tooth of rock overhanging the black mouth of the pit and dropped [a stone?]. I counted ten before it struck bottom, and simultaneously became nervous about the stability of the jutting rock, thought of Rider Haggard, and precipitately retired. I was very, very careful in climbing back up, and I told the brigand that the Hantu at the bottom of this cave was a very big and dangerous one indeed. He instantly agreed and said that he had seen him once, something like a goat and something like a man, and very big. I said he was quite right, and that we’d better leave him alone till I’d worked up a suitable charm to floor him with. Apart from this personal interest, the caves have a scientific one, for we have discovered a “cave fauna” in them, about twenty species, including a snake which we caught in a butterfly net, yet he was 6 good feet long, and probably very poisonous. All these never saw the light, being sightless. They feel their way in continual darkness, existing in a strange little world of their own. Highly interesting, isn’t it?

‘I have been deer-hunting, pigeon-decoying, bull and cock fighting, and all sorts of weird things here. I hope, when Skeat arrives, to get a wizard I am acquainted with, to give an exhibition of devil-raising. I do not say these things flippantly. There *are* some *very strange* things out here among the jungles, cliffs, and caves.’

Kota Bharu, in Rahman, c. June 15, 1899.

‘I like the Malays very much indeed; we have long talks at night, and they tell me all the ghost stories, and about “Hantus”, Spirits, and Jinns, and all sorts of Devils. They have an enormous mythology which they really believe, with the weirdest and most incongruous conceptions imaginable.

‘They admit, and really believe, that I am an advanced devil doctor (Pawang) myself. I barefacedly claim this honour. I have been away in a Malay hut, half a dozen waist-bare folk variously squatting on mats, in a closed space some 8 foot square, lighted by a couple of smoky dammars, all of us smoking or chewing betel, and having chanted and tambourined our nerves into a high state of tension, I have seen a brother Pawang drum himself into a positive epileptic fit, uttering short screams and mirthless laughs, throwing about his head, and twisting his limbs in a most unearthly manner, while we rhythmically drummed and incanted all the faster. The statements he made when in the fit were acted upon with the intention of amending the sick person whom we were professionally attending. It is known that devils had entered into the Pawang while in that state, and while he is coming to they speak through him. I must say he made a tolerably close approach to my preconception of demoniacal possession, but when the devils spoke in friendly and appreciative terms of myself, I was forced to confess it was not the real thing. They said that they had informed me of the best medicine. I stated that I *had* been informed, and that it was well. Then, since the person had dysentery, I administered chlorodyne, produced a rapid cure, and by the Pawang himself (who really seems half to believe it *all*) I am believed to control devils of extraordinary capabilities. I have been told that there are folk who would very much like to see my devils enter me. But I refuse because I am aware that I could not anything like approach the performances of the native professionals. I explained that my “Hantus” are exceedingly shy (“malu”) of entering any one, and they only enter me under the most persuasive circumstances. Further to keep up their reputations, that if they, by mistake, entered any one else, they would almost certainly “bust” him.

‘This may appear rather nonsense to you, but it is good sound, rational, and believable stuff out here, based on a knowledge of the popular opinions and surmises. It isn’t Alice in Wonderland, though it is rather like.’

Kelantan River, July 26, 1899.

‘Twice Hadji Sirath and I have had to work the raft on alone, half the time wading and half punting it along. The river is full of rapids; several times I have passed over rapids or waterfalls of 4 foot fall in almost as many yards, the passage being between rocks hardly apart enough to allow the raft to pass; twice indeed the bamboos of the raft touched on both sides, and once indeed even mounted the rock at one side. Between the wild swirl and rush of the waters, the swift descent of the raft twisting and turning with all its bamboos creaking and splitting, our cries of encouragement and warning, the waving of poles and the splashing of water, these rapids make the most exciting sort of time in their shooting. I would like to have a photograph of our descent immensely. If we made a really bad

shot, the rafts would come instantly to pieces and all my kit would probably be ruined. No other kind of craft would stand it. These rafts are only made of a few bamboos lashed together by rotan, and they bend like fishing rods before they break. Twice we have had to moor out our kits and descend in the raft alone, because it was too risky.

‘Hadji and I sleep together at night on the raft, wherever night overtakes us, which it has up to now in the middle of the jungle. When it rains we put up my waterproof sheet, and go on getting wet as before. You will hardly believe it that, in spite of all this, I am in uproarious good health, and am enjoying it immensely, although I am frightfully savage at having the rest of the trip spoiled.’

‘Now Tomoh is a gold country, worked by a Chinese colony, and one day on the march through it we changed our path from the bed of a large stream to a path (hardly better) through the jungle, when after a while we were petrified by meeting in the midst of the forest a little locomotive engine, and one or two trucks with English gold-mining machinery in them, all broken and decayed, the plates of the engine all burst and broken in all directions, but with its little rusty smoke-stack still erect. There it stood, as though suddenly slain in the midst of action, and now the forest had rapidly overgrown, crowded in and suffocated it, a stout liane twining round the smoke-stack painfully suggesting strangulation. The trail of the white man stood before us, the little engine looked pitiful and melancholy, and it felt as though we were deserting a disabled comrade in the face of a relentless and cruel foe, when we went on, leaving the work of our hands alone again and utterly desolate, to suffer the revenge of the violated jungle. The tale came out later on. Some time ago six “Orang putih”—whites—came here to work for gold. They stayed three years, they found none worth working, and then three of them went back, two died of fever and one by the fall of a rock. They must have been pretty good men because they left a good reputation among the Malays, who speak well of them.’

‘This morning, after great difficulty in obtaining two men, we floated down on our raft very slowly, using paddles, the water now having become too deep to punt, until I got to Kluat a village. There I managed to buy a small prahu, a much swifter craft. Now there are no more rapids, the river being a fine one, about 150 yards wide, running through a hilly and densely afforested country, every now and then coming to a solitary house or Kampong. It is really excessively beautiful, and not in the least monotonous, as was the Amazon. I also managed to get three men to paddle, and actually got them to work nearly all night, chiefly because I could not sleep myself, since the boat leaked, and everything got soaking wet, to say nothing of the rain. We have made excellent progress, and I expect to get to Kelantan by night. One of the men I picked up is a certain Hadji Said,

a wicked old chap who has helped me a great deal, and undoubtedly stolen my pyjama coat. We have become great friends, although he prays fervently and by mention each night, that my head may burn violently in Jehanum. Islam is a frightfully uncompromising religion.'

The following extract from Gwynne-Vaughan's Journal gives an account of an adventure in the Malayan forest :

Near Tremangan.

'The jungle consisted of fairly high trees, and below a swamp, thick-set with *Pandanus*; we had to cut every yard of our way through. I had Akib and Uda with me, and we took turns at leading the way and using the parang. We were waist-deep in very malodorous swampy mud, swarming with leeches, trying to stand on *Pandanus* stumps and crawling along fallen and rotten tree-trunks, every now and then missing our footing and slipping into the horrid, repulsive mud over our middles. The *Pandanus* leaves cut our hands, lianes tripped us up, and the forest mosquitoes and leeches did their utmost to add to our discomfort, and a very melancholy spectacle we made when we got out into a clearing.

'One afternoon while here Akib and I got into a nasty adventure. While in a large padang, about its centre, we looked up and saw the leader of a herd of krebau, which had been grazing in the distance, had approached us uncomfortably near and looked distinctly uneasy. We tried to scare it off without result; at last it stamped its foot impatiently, Akib yelled out "diamon terkan" and lit out for the nearest jungle in fine style, and the krebau made for us; the whole herd, which had quietly crawled up close, also charged at his heels.

'I did a lot of quick thinking, during which I recollected I had only one shot cartridge in my gun, and then I took after Akib, being just in time to see him take a flying leap into the jungle. I put in a record 100 yards, getting home a little to the right of Akib, who, as I shot past, I observed was shinning up a tree as hard as he was able. I went on through the jungle, once nearly knocked down by my collecting tin getting stuck between two trees, and fortunately got through into another padang through which I cut at half-mile pace only. At the edge of the next jungle I stopped, and Akib shortly joined me, saying that the krebau had followed me and had not gone through far. I would have much liked to climb a tree myself, but I had the gun to look after.'

Gwynne-Vaughan was back in London on September 26, 1899, having been absent a little over seven months.

Caledonian Hotel, Strand, September 26, 1899.

'I am glad to get back of course . . . but really I feel strangely that I am an outsider looking on at the show, and hardly having any definite

part in it to play, my interests being still right away back with the honest, clean, and simple savagery of the Malay.'

His friend Lang, who was himself in the Malay Peninsula a year or two afterwards, writes to me as follows on the subject of Gwynne-Vaughan's travels:

'The expedition, as you know, had a pretty adventurous time in the unexplored Siamese States as well as in better-known Eastern States of the Peninsula. The experience made a deep impression on Gwynne-Vaughan's life and thought, but not on his work, which he continued on the straight line on his return. Apart from collecting for the expedition and loyally handing over all the results, he drank deeply of the life with the Malays, who were after his heart in many ways. The Malay attitude to many things was always with him afterwards, and since I was there, a little later, we kept up an interest in the subject and for a time hoped to return. Malay proverbs and phrases were always coming from him as the appropriate expression of his thought in circumstances little dreamt of in the East.

'The Amazon expedition was a much rougher and less scientific experience, but he was younger, and got great joy of adventure in pulling through tight places in which the whites were often more savage than the natives. The experience appealed to his joy in adventure, which was always a current parallel to that of his almost too conscientious discharge of the duties of his various posts.

'This side of him came out in his fishing expeditions to out-of-the-way spots in Ireland and the Hebrides, where he loved to meet with all sorts and conditions of men, and not to be suspected of having been "academic".'

There is nothing to add to these words, which seem to me to express perfectly the significance of Gwynne-Vaughan's journeys in his life.

After he returned from the Malay expedition he took up the thread of his work, where he had dropped it, and his most important publications date from the period which then opened. These will be considered afterwards; his career may be first shortly sketched. He remained at Glasgow till 1907—ten years in all. He assisted his Professor in preparing the second edition of the 'Practical Botany for Beginners', which appeared in 1902 under their joint names. I believe this was the only work in book form in which he took part.

In 1904 he became lecturer in Botany at Queen Margaret's College, Glasgow, in addition to his other University duties.

In 1907 his long and happy association with the University of Glasgow came to an end, and he accepted the post of Head of the Department of Botany at the Birkbeck College, becoming a Recognized Teacher and Internal Examiner in the University of London. He did not, however, remain for very long in the ranks of London botanists, for two years later, in 1909, he became Professor of Botany in the Queen's University at

Belfast, a post which he held for five years. On his appointment he wrote to me :

‘ It will be a great change at first from the “ intensive ” kind of work we do here in London. In spite of the much too hard work I have had to do here, I shall leave London with great regret. I am very fond of the South.’ He speaks also of the ‘ keen and appreciative students ’ he had at the Birkbeck.

Although somewhat isolated from his botanical colleagues, he was happy in his relations with his fellow professors at the University of Belfast. He accomplished much good work while there, especially continuing the joint research with Kidston on the Fossil Osmundaceae, begun at the end of the Glasgow period.

On December 7, 1911, he married Dr. H. C. I. Fraser, the distinguished cytologist, who had succeeded him as Head of the Department of Botany at the Birkbeck, a post which she continued to hold during their married life and still occupies.

In July, 1914, to the great joy of his friends in England, he accepted the chair of Botany in University College, Reading, which unhappily he was only destined to hold for about a year.

At Belfast the teaching work had been much concentrated in the Summer term, and was then very hard ; at Reading it was more spread over the whole year, and would probably have proved less exacting when he had once got settled in the new position.

He had long been seriously troubled with neuralgia, though few of his friends were aware of it. In spite of failing health, he was able to carry out to the end the duties of his first academic year, completing the work of the Summer term, though with some difficulty. During the vacation he became seriously ill, and, after some fluctuations, the end came on September 4, 1915, the immediate cause of death being a rapid onset of tuberculosis. His friend Lang, who was with him almost at the last, says : ‘ He was very weak and changed, but, when he talked, absolutely himself. It was the bravest end to a long fight.’

I saw him last myself, about the end of January, when he was in his usual health, and we had a long and lively talk, partly on botanical subjects, especially that strange fossil, *Tempskya*, and partly on the war.

His position as a botanist, and the great services to science which he was able to render in the course of a too short life, will best be considered after a brief survey of his published work. Before going on to this, a few words may be added about his relations to the British Association and other Societies.

When the Association met at Glasgow in 1901, Gwynne-Vaughan was one of the Secretaries of Section K. He was again Secretary at Winnipeg, Sheffield, and Portsmouth (1909-11), and at Dundee and Birmingham

(1912-13) he was Recorder of the Section. He contributed greatly to the success of the Botanical Section while an officer, and would have made an excellent President if he had lived.

In 1909 he received the MacDougall Brisbane Medal for Research from the Royal Society of Edinburgh, and in 1912 became a Member of the Royal Irish Academy. In 1914 he was appointed External Examiner to the University of Glasgow.

He was elected a Fellow of the Linnean Society in 1907, and was a member of Council at the time of his death.

Published Work.

Gwynne-Vaughan's first publication was a Note in 'Science Gossip' (June 1894) on the rare Crucifer, *Arabis stricta*, Huds., the Bristol Rock Cress. He had found it on an ancient camp, near Llandrindod, Radnorshire, and sent it to the Editors, who confirmed his identification, adding that 'any records of so rare a plant are particularly interesting'. So far as I know, it had previously been recorded only from Clifton and Cheddar, and its speedy extinction was anticipated by Bentham and Hooker.

The first published result of his research work at Kew was a Note in the 'Annals of Botany' (1896. 1), 'On a New Case of Polystely in Dicotyledons'. At that time we were very keen on polystely and such phenomena, under the influence of Van Tieghem's anatomical conceptions. Gwynne-Vaughan showed that the tuber-bearing stolons in certain species of *Nymphaea* have a clearly polystelic structure, which he compared with the structure of the main stem in the related genera *Cabomba* and *Brasenia*. What was still more important in those days, he was able to demonstrate, within the family, a complete series of transitions between polystely and astely.

The paper read at the British Association that year, which so impressed Professor Bower, covered nearly the same ground, but added the new fact that 'root-bearing steles' occur in the rhizomes of *Victoria* and *Nymphaea* spp. (1896. 2).

The full paper 'On the Morphology and Anatomy of the Nymphaeaceae' was published in the Transactions of the Linnean Society (1897. 1). I had to read it for him (on Feb. 18) as he was then busy at Glasgow. It is a rather miscellaneous paper, for he began with the morphology of the leaf, showing how the ontogeny of the individual adult leaf repeats the successive forms of the seedling leaves, constituting a special case of Recapitulation. He also investigated the origin of the peltate form of leaf. He pointed out the remarkable absence of any primitive stages, whether morphological or anatomical, in the seedling of *Nelumbium*, so different from the conditions in the Water-lilies.

The anatomical portion of the paper is an extension of the results communicated in his preliminary notes, illustrated by excellent drawings.

From a purely anatomical point of view, Gwynne-Vaughan's other Kew paper, 'On Polystely in the Genus *Primula*' (1897. 2), is perhaps more important. He paid much attention to the variations of stelar structure in the same species and in different parts of the individual plant. He was able to show that gamostely is not an advanced condition due to the fusion of steles, but is more primitive than dialystely, and that a gamodesmic structure (with the bundles united, but not completed to form steles) probably preceded either. He followed the anatomical development of the seedling in gamostelic and dialystelic species with much care, and found different modes of transition from the original monostely to the perfect or imperfect polystely of the adult stem. His results marked a distinct advance on Van Tieghem's interpretations, and had a direct bearing on his own later work on the Ferns.

This work, as we have seen, was in full progress during the interval between his two tropical journeys. Publication did not begin till some time after his return from the Malayan expedition, when the first paper on the Anatomy of Solenostelic Ferns appeared, dealing with the remarkable New Zealand Fern, *Loxsoma Cunninghamii* (1901. 1). He revived the term 'solenostely' invented but afterwards discarded by Van Tieghem, in place of the then familiar 'gamostely', on the ground that the latter term implies a *fusion* of steles supposed to be originally distinct; in most cases this is the reverse of the truth, the solenostelic preceding the dialystelic condition, as shown by the development of the individual plant. The conception which lies at the root of Gwynne-Vaughan's Fern anatomy thus follows directly from the results he first attained by his study of the Primulas.

The solenostele is defined as a single hollow vascular cylinder, interrupted only by the departure of the leaf-traces. The conception is thus narrower than that of gamostely. In Jeffrey's terminology, Gwynne-Vaughan's solenostely forms 'a special type of amphiphloic phyllosiphony', i.e. a vascular tube with internal as well as external phloem, interrupted by leaf-gaps.

The comparative rarity of solenostely is pointed out, the Ferns offering the chief examples.

The detailed investigation of *Loxsoma* not only established an excellent type of solenostely, but proved interesting in other ways, especially in the demonstration of two kinds of protoxylem, endarch and spiral in the leaf-trace, exarch and scalariform in the stele. The affinity of the genus was regarded as closest with the Dennstaedtiaceae, while some relation to Gleicheniaceae, Hymenophyllaceae, and Schizaeaceae was also recognized.

The second part of the Solenostelic work, which appeared two years later (1903), had a much wider scope, and extended to Ferns of other than solenostelic structure. It is, in fact, one of the chief existing contributions to Filicinean anatomy.

Gwynne-Vaughan showed that the dictyostely (typical polystely or dialystely of Van Tieghem), so common in Ferns, is 'primarily due simply and solely to the overlapping of the leaf-gaps in a solenostele', though other gaps in the tube may occur, as in *Dicksonia rubiginosa*. He traced the origin from the solenostele of internal vascular strands, and of internal tubes, such as were found by him in *Pteris elata*, and were previously known in *Matonia*.

Incidentally he called attention to a curious historical point. 'Having first come to the conclusion that Ferns do not possess true seeds, Cesalpino proceeded to deduce the fact that they cannot possess true stems either.'

This, then, was the strange origin of the belief, so obstinately maintained, even down to our own times, that the 'caudex' of a Fern is merely a sympodium of leaf-traces. It also became the source of the 'phyton' theories of Gaudichand and others. Gwynne-Vaughan showed that the apparent segmentation of certain Ferns is really to be regarded as a late development rather than as a primitive feature. In connexion with this question he investigated the course of the internal strands of Cyatheaceae and other Ferns, and found, in agreement with Trécul, that they are not decurrent leaf-traces, but strictly and essentially cauline.

He thoroughly worked out the development of the dictyostele in the young plant of *Alsophila excelsa*, and showed that after the protostelic stage a core of phloem first appears, then the internal pericycle, next the endodermis, and finally the central ground tissue, the structure thus becoming a solenostele. The leaf-gaps as they begin to overlap convert this into a dictyostele, and ultimately the complexity of the mature structure is attained by the nipping off of the internal strands from the main vascular tube.

When lateral shoots are developed they repeat, more or less imperfectly, the ontogeny of the plant as a whole.

The paper, in which I have only indicated a few characteristic points, concluded with a theoretical discussion of the theory of the stele. Gwynne-Vaughan strongly inclined to the view that the origin of the central parenchyma in the higher Ferns was to be regarded as stelar, though he admitted that Jeffrey's opinion, that it arose from the cortex, was theoretically possible.

The diagrams of the stelar structure in the solid are an excellent feature of the plates, and so are the combined photographs and drawings, an under-exposed print being used as a *camera-lucida* sketch.

The paper is altogether an admirable type of modern anatomical work,

under the influence of the Theory of Descent—the comparative anatomy of the Darwinian period at its best.¹

Going back to the year 1901, there is a Note 'On the Nature of the Stele in *Equisetum*' (1901. 2), a subject on which he never published in full, though he continued to give it much attention. He regarded the vascular bundle of *Equisetum* as a compound structure—'of the three strands of xylem present in each bundle of the internode, the carinal strand alone passes out at the node as a leaf-trace'. 'So the xylem of the so-called vascular bundle of *Equisetum* consists of three strands, two of which are lateral and cauline, while the median, or carinal, strand is common to both stem and leaf. The fact that only a small portion passes out as a leaf-trace, and not the bundle as a whole, constitutes an essential point of difference between it and the bundle of a Phanerogam.'

He further pointed out that the lateral xylem-strands in *E. giganteum* gave a strong impression of centripetal development. He compared the stele of *Equisetum* with the protostele of *Sphenophyllum*, and with the various degrees of medullation found in the Lepidodendreae, and suggested that the lateral xylem-strands in the recent genus 'may perhaps be taken to represent the last remnants of a primitive central mass'. His idea was that the lateral strands in *Equisetum* might correspond to the prominent points of the primary xylem in *Sigillaria*, in the hollows between which the protoxylems lie.

This Note must not be taken as representing Gwynne-Vaughan's final view of the morphology of the stem in *Equisetum*. Judging from letters of his (1912), and from manuscripts he left, it appears that while he always maintained his view of the triple nature of the bundle, and of the essentially protostelic character of the vascular system, he was inclined to give up the centripetal development of the lateral strands, and to admit the possible occurrence of leaf-gaps in certain cases. The whole question is an interesting one, and it is much to be regretted that Gwynne-Vaughan's mature views were never fully recorded.

In a Note (1902) 'On an Unexplained Point in the Anatomy of *Helminthostachys Zeylanica*', Gwynne-Vaughan described for the first time the curious canals which lead down through the cortex almost to the stele, one in front of each leaf. He thought it 'possible that they represent the last indications of vestigial axillary buds', a suggestion which has since been confirmed by the work of his friend Lang.²

We owe to Gwynne-Vaughan (1905. 1) the first description of the anatomy of the new genus of Marattiaceae, *Archangiopteris*, discovered by Dr. Henry in China. The structure was compared with that of *Kaulfussia*,

¹ The British Association Note (1901. 3) is preliminary to the paper just considered.

² W. H. Lang, Studies in the Morphology and Anatomy of the Ophioglossaceae. III, p. 14. Ann. of Bot., January, 1915, vol. xxix.

both being relatively simple forms anatomically. Interesting conclusions were drawn regarding the anatomical distinctions between the Marattiales and Filicales; among the characters peculiar to the former group the internal protophloem is the most striking.

Another paper of the same date (1905. 2) has a curious title: 'On the Possible Existence of a Fern Stem having the Form of a Lattice-work Tube'. The epidermal pockets found in the Ostrich Fern and other species are compared with the *endodermal* pockets which started the lattice-work structure of the vascular system in so many Ferns. If the epidermal pockets likewise became continuous, the whole stem might assume the form of a lattice-work tube. Both series of changes are due to the increasing dominance of the leaf and the leaf-traces. It is an ingenious little paper of an unusual kind.

Leaving the joint series with Kidston for future consideration, we will next take Gwynne-Vaughan's much-disputed work 'On the Real Nature of the Tracheae in the Ferns' (1908). In this paper he endeavoured to show:

(a) That the pits in the Ferns investigated are open.

(b) That the middle lamella of the tracheal wall is absorbed, leaving an open vertical passage between the bars of thickening.

The investigation was suggested by the appearances observed in some of the fossil Osmundaceae. He summed up his conclusions as follows: 'The xylem elements of the Pteridophyta are, for the most part, vessels with true perforations in their longitudinal as well as in their terminal walls.'

'In the Osmundaceae, *Nephrodium Filix-mas*, and probably others, a special type of vessel occurs which is characterized by the complete disappearance of the primary tracheal wall at certain points, so that the cavities of the pits are vertically continuous in the middle of the wall.'

Gwynne-Vaughan's results were controverted by Halft in 1910, and by Miss N. Bancroft in the following year. Their work leads to the conclusion that the old view was right, i.e. that the pits in Pteridophyta are, as a rule, closed, and that the middle lamella is persistent.

Gwynne-Vaughan was in touch with Miss Bancroft's work, and helped her with criticism and advice.

This is not the place to discuss the question, but I may be permitted to quote the following passage from a letter of Mrs. Gwynne-Vaughan's, which defines her husband's position in the matter:

'With regard to the Fern-tracheae I think I can best summarize my husband's view by saying that he thought the question required further investigation. I do not think he would ever have undertaken this himself; it did not interest him as much as the other things he had worked on.'

We have now reached the period of Gwynne-Vaughan's co-operation with Kidston, a most happy conjunction which gave rise to much good

work, and especially to the fine series of memoirs on the Fossil Osmundaceae.

I am told that Kidston and his future colleague first met at Cambridge, during the British Association Meeting of 1904, and at once became friends.

Their joint work began soon after while Gwynne-Vaughan was still at Glasgow, but their first paper was published in 1907, the year he left, and from that time onwards they had to arrange special meetings during vacations, usually at Stirling. A well-known photograph shows them hard at work together in the study at 12 Clarendon Place.

The series on Fossil Osmundaceae is of exceptional interest, for the authors trace back an existing family from recent times to the Permian, on sound evidence, mainly anatomical. Nothing quite like this has been done for any other group. There are five Parts, ranging in date from 1907 to 1914, all published in admirable form in the Transactions of the Royal Society of Edinburgh.

Part I (K. and G.-V., 1907) deals with four species of *Osmundites*: *O. Dunlopi* and *Gibbiana*, new species from the Jurassic of New Zealand, *O. Doukeri*, Carr., from the Lower Eocene of Herne Bay, and *O. skidegatensis*, Penh., from the Lower Cretaceous of the Queen Charlotte Islands. The first three are more or less typical members of the family; *O. Dunlopi* approaches *Todea*, but was found to have a 'practically continuous xylem-ring'; the other two are nearer *Osmunda*.

The Pacific species, *O. skidegatensis*, intermediate in age between the New Zealand and the Herne Bay fossils, showed a much more complex structure than either, or than any living species. The wonderful preservation exhibited the structure to perfection, and the plant proved to have well-developed internal phloem, continuous through the leaf-gaps with the external phloem-zone. In fact *O. skidegatensis* comes very near the *dictyostelic* ancestor of the Osmundaceae, postulated by Jeffrey. Kidston and Gwynne-Vaughan, however, regarded the plant rather as marking the culminating point in the development of the family.

In this first memoir the authors anticipated the discovery of ancestral types with a continuous zone, or even a solid mass of xylem, and suggested a common origin of the Osmundaceae with *Botryopteris* and *Zygopteris*.

Their anticipation was soon realized; in their second memoir (K. and G.-V., 1908. 1) they described two species from the Upper Permian of Russia, establishing the new genus *Zalesskya* for them. In *Z. gracilis* (Eichwald) they found a wide, continuous ring of wood, divided into two zones, the inner of which consisted of short and broad tracheides. In *Z. diploxylon*, sp. nov., there was evidence that the xylem was solid, the inner zone extending to the centre of the stele. This may also have been the case in the former species, though there the internal tissue had entirely

perished. The rest of the structure, especially that of the petioles, appears to leave no doubt of the relationship to Osmundaceae.

In the third memoir (K. and G.-V., 1909) other species from the Russian Permian are described, of which *Thamnopteris Schlechtendalii* (Eichwald) is much the most important. In this fine fossil conclusive evidence was found for protostelic structure, the inner region of the solid xylem consisting here also of large, thin-walled, reticulate tracheae.

A full account was also given of the structure of the leaf-trace, which passes from mesarchy to endarchy in its outward course. A preliminary communication on this point had been published in the previous year (G.-V. and K., 1908. 2). The origin of the endarch from the mesarch leaf-trace was held to be general in the Filicales.

In the 'general conclusions' of Memoir III the authors laid stress on the approach in the stem of *Thamnopteris* to the structure of *Zygopteris corrugata*, and predicted the discovery of a *Zygopteris* with a solid xylem and central short tracheae; this was almost exactly realized immediately afterwards by Dr. Gordon's discovery of the stem of *Diplolabis*, a Lower Carboniferous Zygopterid.

The fourth memoir (K. and G.-V., 1910) is concerned with *Osmundites Kolbei*, Seward, from the Wealden of the Cape, and *O. Schemnitzensis* (Pettko) from the Miocene of Hungary. The latter is well preserved, but of ordinary structure. In *O. Kolbei*, described externally by Seward in 1907, the pith was much compressed, but the authors found that it contained undoubtedly tracheal elements; they add: 'There is no doubt whatever that the tracheal elements are true and real constituents of the central tissue.' They regarded this tissue, therefore, as a 'mixed pith', essentially similar to that in the stele of *Zygopteris Grayi*, *Z. corrugata*, &c. Another point of interest in *O. Kolbei* was that the leaf-traces pass out without immediately causing an interruption of the xylem-ring, i.e. that the leaf-gap only begins some little distance above the outgoing trace.

In this memoir the geological distribution of all the forms so far described is tabulated.

The general discussion is of great value. The importance of Zenetti's remarkable work on the structure of *Osmunda*, written long before there was any knowledge of the fossil history, is fully recognized. The Zygopterideae are discussed at length, in the light of Paul Bertrand's elaborate investigations, and their relation to the Osmundaceae considered. The peculiar Zygopteridean frond, so unlike anything in recent Ferns, is regarded as derived from the type common to the Osmundaceae and the Filicales generally.

The possibility is recognized that the Permian genera *Zalesskya* and *Thamnopteris* may eventually require a new Order, though on existing evidence they must be included in the Osmundaceae.

These four memoirs constitute a complete whole, but the observation of additional forms led to the publication, after an interval of four years, of a fifth memoir (K. and G.-V., 1914).

The chief species described are *Osmundites spetsbergensis* (Nathorst) from the Upper Tertiary of Spitzbergen, and *O. Carnieri*, Schuster, a Paraguay species of doubtful age (Jurassic—Tertiary).

The Spitzbergen species, though it shows no stem, is interesting from the fact that the structure of leaflets and sporangia is preserved, as well as that of the petioles; it is a modern type, resembling *Osmunda Claytoniana* in petiolar structure, and *O. regalis* in the form of the frond. A solenostelic Fern stem was found burrowing among the roots of the *Osmundites*.

O. Carnieri is more remarkable. It is unusually large, the stem measuring 90 mm. and the stele 35 mm. in diameter. The vascular ring is in the form of several meristeles, each surrounded by its own endodermis, and including a varying number of bundles. The preservation is imperfect, but it is probable that the phloem extended all round each meristele, the structure thus being completely dictyostelic. This form is of great interest in conjunction with *O. skidegatensis*, and may lead to important conclusions when more is known about it.

This completes the main series on Osmundaceae, but there are two small papers by Gwynne-Vaughan alone, dealing with recent members of the same group. The earlier of these, 'Some Remarks on the Anatomy of the Osmundaceae' (1911), is concerned with the possible retention of the primitive features of fossil forms in the young plants of recent Osmundaceae.

The chief definite character found to be retained is the mesarchy of the leaf-trace, occasionally occurring in early leaves of *O. regalis*. The ontogenetic evidence also favours the intrastelar origin of the pith and medullary rays. A full and acute discussion of the general question of Recapitulation is of remarkable interest.

The final paper on the Order is 'On a Mixed Pith in an Anomalous Stem of *Osmunda regalis*' (1914). The abundant medullary tracheae met with in this specimen were evidently formed in response to an injury. The value of the observation depends on the credence attached to Jeffrey's theory that traumatic characters tend to be ancestral. Accepting this, the evidence of the injured specimen tells in favour of the protostelic theory of Osmundaceous anatomy. The argument is a good one, as addressed to the Jeffrey school, but the morphological value of traumatic characters is still very much of an open question.

The Osmundaceae work as a whole is perhaps unique as a study of the comparative anatomy of recent and fossil members of a definite group, ranging over so long a period of geological time. Certain points are still the subject of controversy, and some of the facts may admit of diverse

interpretations, but the value of the work accomplished by Kidston and Gwynne-Vaughan is solid and lasting.

Two more palaeobotanical memoirs by the same authors remain to be noticed. The first of these (K. and G.-V., 1911) gives the first intelligible and satisfactory account of the structure of *Tempskya*, a group of fossils which had puzzled palaeobotanists ever since the year 1824. *Tempskya* consists of a dense mass of Fern roots, traversed by a number of larger organs, variously described as petioles or stems. The authors investigated an unusually good specimen of a *Tempskya* from Russian Turkestan, which they named *T. Rossica*. They found that it consisted of a number of solenostelic Fern stems, running longitudinally through a dense felt of their own adventitious roots. The stems bear two rows of leaves on one side and roots on the other, thus showing themselves to be of dorsiventral structure. They keep parallel to each other and to the general course of the roots, but face indiscriminately in all directions. They branch dichotomously. The authors' interpretation of the facts is that the numerous stems with their felt of roots together formed an erect 'false stem', the individual true stems becoming free at the top and bearing the leaves. A restoration of the plant as it is conceived to have appeared in nature was prepared; it was not published with the paper, but was shown at the British Association Meeting at Sheffield in 1910, and has been reproduced in Dr. Marie C. Stopes's British Museum Catalogue of the Cretaceous Flora, Part II, p. 15.

This interpretation of the structure receives support from the analogy of a recent Tree-fern, *Hemitelia crenulata*, described by Schoute in 1906; in this strange plant a number of branches are actually felted together by a mass of their own roots, to form a false stem.

The excellent paper on *Tempskya*, as it appeared in the Transactions of a Russian Society, is not very accessible to English readers, but a full abstract will be found in Dr. Stopes's Catalogue, above referred to.

The memoir on *Stenomyelon tuedianum*, Kidston (K. and G.-V., 1912), was intended to form the first of a series on the Carboniferous Flora of Berwickshire. So many important forms remain to be described, that it is to be hoped that Dr. Kidston, in spite of the grievous loss of his collaborator, will see the scheme through.

Stenomyelon, originally found by Matheson in 1859, and re-discovered by Kidston, who obtained much better specimens, in 1901, is of Lower Carboniferous age, and is a remarkable and isolated form, referred to the transitional group which we call Cycadofilices. The structure is well preserved, and the investigation does it justice. The memoir is clear, full, concise, and perfectly illustrated, and may well serve as a model of structural work in palaeobotany.

We have now passed in rapid survey through all the published work in which Gwynne-Vaughan took part.

Two papers, I am informed, were left unpublished, but in a sufficiently advanced state to warrant the hope that they may soon see the light. Their subjects are: 'On some climbing Davallias and the Petiole of *Lygodium*', and 'Observations on the Anatomy of the Leaf in the Osmundaceae'.

There is also a considerable amount of manuscript with many Figures, relating to the genus *Equisetum*, in which he had so strong an interest. The chief part of this material was prepared with a view to a joint work on Equisetales and other groups which Gwynne-Vaughan and I had in contemplation. Its fate is still undecided.

Gwynne-Vaughan's chief subject as an investigator may be described as the comparative anatomy of Plants from the point of view of Descent. His work belongs essentially to the Darwinian period; if he had lived, it would have been interesting to see how far he might have been influenced by the modern tendency in the direction of Experimental Morphology. But I think the phylogenetic interest would always have been the main one to him, as it is to the present writer.

He became an anatomist at Kew; it was at Glasgow that he was led to specialize, with such admirable success, on the anatomy of Pteridophyta and above all Ferns. In this subject, so characteristic of modern English Botany, no one surpassed him.

The phylogenetic study of Fern anatomy demands a knowledge of fossil forms, and here his association with Kidston was of the happiest influence, and gave rise to the best of his later work. He made the utmost use of his opportunities, and I was often impressed by his own accurate knowledge of fossil types.

He had accomplished so much, and his judgement was so thoroughly sound, that great things might have been looked for from him, if all had not ended so much too soon.

Gwynne-Vaughan's original work lay within a well-defined field, but he was actively interested in other branches of his science, and, in particular, was very keen on the Algae, at which he worked hard on his occasional visits to the coast, from Glasgow and elsewhere.

With students, who are generally good judges of character, he was, I am told, remarkably successful. At Glasgow, for example, he took a great interest in the athletic life of the University, and was very popular. In all his various posts he established a tradition among his students of trying to obtain first-hand information and to demonstrate things for themselves. Both in the laboratory and on excursions he had the power of inspiring interest and of making difficulties clear.

Those who knew him only from his published work, necessarily of a technical character, would have formed little idea of him as he really was.

Like Darwin, he was a sportsman even before he was a naturalist ; we have seen how it was he who did the shooting on the Malay expedition ; he always kept his taste for open-air pleasures.

Though so much of his life was spent at Universities, he was very far from having an academic mind ; his love for Natural Science was inborn. This is shown by the way he came to Kew, entirely of his own choice, as soon as he was free to follow his natural bent.

Another side of his character is shown by his marked interest in Malayan demonology, and generally in the customs and sayings of a primitive people. Here, again, his interest was sympathetic, and not merely that of an anthropologist.

Gwynne-Vaughan's personality was altogether attractive and original, and those who knew him felt that he was somehow different from the usual type of scientific man of his generation.

He was a delightful and amusing companion, while at the same time his manner had a pleasant touch of old-world courtesy. He made warm friends, as was natural. Now that he has gone, so prematurely, we feel that, whether personally or scientifically, there could scarcely have been a greater loss to English Botany.

D. H. SCOTT.

LIST OF PUBLISHED RESEARCHES.

- 1896. 1. On a New Case of Polystely in Dicotyledons. Note. *Annals of Botany*, 1896.
- 1896. 2. On some Points in the Morphology and Anatomy of the Nymphaeaceae. *Annals of Botany*, 1896.
- 1897. 1. On the Morphology and Anatomy of the Nymphaeaceae. *Trans. Linn. Soc. Lond.*, 1897.
- 1897. 2. On Polystely in the genus *Primula*. *Annals of Botany*, 1897.
- Observations on the Anatomy of Solenostelic Ferns :
 - 1901. 1. Part I.—*Loxsonia*. *Annals of Botany*, 1901.
 - 1903. Part II. *Annals of Botany*, 1903.
- 1901. 2. Remarks on the Nature of the Stele of *Equisetum*. *Annals of Botany*, 1901.
- 1901. 3. Some Observations upon the Vascular Anatomy of the Cyatheaceae. *Annals of Botany*, 1901.
- 1902. On an Unexplained Point in the Anatomy of *Helminthostachys Zeylanica*. *Annals of Botany*, 1902.
- 1905. 1. On the Anatomy of *Archangiopteris Henryi* and of other Marattiaceae. *Annals of Botany*, 1905.
- 1905. 2. On the Possible Existence of a Fern Stem having the Form of a Lattice-work Tube. *New Phytologist*, 1905.
- 1908. On the Real Nature of the Tracheae in the Ferns. *Annals of Botany*, 1908.
- 1911. Some Remarks on the Anatomy of the Osmundaceae. *Annals of Botany*, 1911.
- 1914. On a Mixed Pith in an anomalous Stem of *Osmunda regalis*. *Annals of Botany*, 1914.

In collaboration with R. Kidston, Esq., LL.D., F.R.S., F.G.S.

On the Fossil Osmundaceae :

- KIDSTON and GWYNNE-VAUGHAN. 1907. Part I.—*Osmundites*, sp. novae. Trans. Roy. Soc. Edin., 1907.
- " " 1908. 1. Part II.—*Zaleskya*. Ibid., 1908.
- " " 1909. Part III.—*Thamnopteris*, *Bathypteris*, *Anomorrhoea*. Ibid., 1909.
- " " 1910. Part IV.—*Osmundites Kolbei*. Zygopteridene. Ibid., 1910.
- " " 1914. Part V.—*Osmundites* spp. Ibid., 1914.
- GWYNNE-VAUGHAN and KIDSTON. 1908. 2 : On the Origin of the Adaxially Curved Leaf-trace in the Filicales. Proc. Roy. Soc. Edin., 1908.
- KIDSTON and GWYNNE-VAUGHAN. 1911. On a New Species of *Tempskya* from Russia. Verhandlungen der Russ. Kais. Mineral. Gesellschaft, Bd. xlviii, 1911.
- " " 1912. On the Carboniferous Flora of Berwickshire. Part I. *Stenomyelon tuedianum*. Trans. Roy. Soc. Edin., 1912.

The portrait is from a photograph taken in 1911 by Frederick Hollyer, 9 Pembroke Square, Kensington, W.